We use the Caves-Christensen model as a point of departure for exploring the relationship between output growth and LEC TFP growth. The analysis begins with the cost function. The cost function relates the total cost of inputs to the levels of outputs, the levels of input prices, the size of the network over which the services are being provided, and the level of technology:[4]

$$C = C(Y,W,N,t) \tag{1}$$

[4]In the Caves and Christensen analysis, capacity utilization of quasi-fixed factors is also incorporated into the analysis. Because Caves and Christensen found that capacity utilization is not a determining factor in telephone TFP growth we have not included it in the model discussed in this report.

where

C = total cost of inputs
Y = vector of output levels
W = vector of input prices
N = size of network
t = level of technology.

The rate of change in total cost can then be related to the rates of change in outputs, the rates of change in input prices, the rate of change in the network size, and the rate of technological change. Formally, the relationship is:

$$c = \Sigma\, \epsilon_i \cdot y_i + \Sigma\, s_j \cdot w_j + \epsilon_n \cdot n - v \qquad (2)$$

where

c = rate of change in total cost
y_i = rate of change in output i
w_j = rate of change in input price j
n = rate of change in network size
v = rate of technological change
s_j = share of input j in total cost
ϵ_i = cost elasticity of output i
ϵ_n = cost elasticity of network size.

Next, the rate of change in total cost can be decomposed into the rate of change in input prices and the rate of change in input quantities:

$$c = \Sigma\, s_j \cdot w_j + \Sigma\, s_j \cdot x_j \qquad (3)$$

where

x_j = the rate of change in input quantity j.

Substituting equation (3) into equation (2) yields the following result:

$$\Sigma\, s_j \cdot x_j \;=\; \Sigma\, \epsilon_i \cdot y_i \;+\; \epsilon_n \cdot n \;-\; v \tag{4}$$

The left-hand side of equation (4) represents the rate of growth in the quantity of total input. The rate of growth in the quantity of total input is related to the rate of growth in output, growth in network size, and the rate of technological change.

The rate of growth in TFP (the difference between the rate of growth in total output and the rate of growth in total input) can be related to output growth, growth in network size, and technological change via equation (4):

$$\begin{aligned} tfp &= \Sigma\, m_i \cdot y_i - \Sigma\, s_j \cdot x_j \\ &= \Sigma\, (m_i - \epsilon_i) \cdot y_i - \epsilon_n \cdot n \;+\; v \end{aligned} \tag{5}$$

where
- tfp = rate of TFP growth
- m_i = share of output i in total revenue.

Economies of density are present when the sum of the cost elasticities of output (the ϵ_i) is less than one; economies of scale are present when the sum of the cost elasticities of output and the network elasticity ($\Sigma\, \epsilon_i + \epsilon_n$) is less than one. When economies of scale or economies of density are present, increasing the level of output over the network increases TFP, because the revenue shares are larger than the cost elasticities ($\Sigma\, (m_i - \epsilon_i) > 0$). The contribution to TFP growth of each output depends on its growth rate and on the difference between its revenue share and its cost elasticity. As the difference between the revenue share and the cost elasticity increases, the contribution of output growth to TFP growth increases.[5]

IV. Review of Telecommunications Industry Econometric Studies

Caves and Christensen analyzed TFP growth in six industries: telephone, electric power, airline, railroad, urban bus, and trucking. They examined the contributions of economies of scale, economies of density, and capacity utilization to TFP growth in each industry. Their analysis of the telephone industry relied on the two major econometric studies of the U.S. telephone industry that had been completed at the time of their study.[6] Both these studies show a strong relationship between output growth and TFP growth. Though neither study includes measures of network size, Caves and Christensen concluded that the relationship between output growth and TFP growth was largely due to economies of density.

Two limitations of the studies on which Caves and Christensen rely are that neither study addresses the role of network size on TFP growth and both studies focus on the entire Bell System, which included both the Operating Companies (the

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[5]As discussed in Section V, one must recognize that factors which historically led to TFP growth may not provide the same contribution in the future.

[6]L.R. Christensen, D.C. Christensen, and P.E. Schoech, "Econometric Estimation of Scale Economies in Telecommunications," in L. Courville, A. de Fontenay, and R. Dobell, eds., Econometric Analysis of Telecommunications, (Amsterdam: North-Holland Press, 1983), and M.I. Nadiri and M.A. Schankerman, "The Structure of Production, Technological Change, and the Rate of Growth of Total Factor Productivity in the U.S. Bell System," in T. Cowing and R. Stevenson, eds., Productivity Measurement in Regulated Industries, (New York: Academic Press, 1981).

Local Exchange Carriers) and the Long Lines division. Bell Communications Research provided an econometric cost analysis in 1987 of the Bell Operating Companies that specifically addresses the issue of network size.[7] Using the methods developed by Christensen, Christensen, and Schoech, Bellcore developed measures of output and input for the Bell Operating Companies, covering the years 1972 to 1982.[8] The econometric models estimated from these data include measures of network size. The estimated models show substantial economies of density, but constant returns to scale. This means that average cost decreases as output increases over a network of a given size, but average cost does not decrease when output and network size both increase at the same rate. The Bellcore results show that a one percent increase in output, holding network size fixed, leads to approximately a .8 percent increase in TFP.

In two recent papers, Richard Shin and John Ying have attempted to focus on local carriers and incorporate measures of network size. While there are some problems in the data used in both of these papers, their results indicate support for large economies of density. The first of these studies is based on data for 58 local telephone companies over the 1976-1983 period.[9] The output measures used in the study are number of local calls and number of toll calls, which fail to adequately

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[7] "Econometric Estimation of the Marginal Operating Cost of Interstate Access," Special Report SR-FAD-000552, May 1987.

[8] The database contained quarterly observations.

[9] "Unnatural Monopolies in Local Telephone," Rand Journal of Economics, Summer 1992, pp. 171-183.

capture the heterogeneity of services provided by local exchange companies. They characterize a third variable used in the analysis, number of access lines, as an output variable, but this variable characterizes the network over which services are being provided. The data also constrain Shin and Ying in the measurement of prices and quantities for the inputs. They assume quantity indexes for capital and for materials, rents, and services can be accurately represented by the number of access lines.

At the sample mean, the cost elasticities of local calls, toll calls, and access lines sum to .94, which shows minor economies of scale. However, the sum of the local call and toll call elasticities equals .25, which shows considerable economies of density. This would imply that a one percent increase in local and toll calls would increase TFP by .75 percent. The second Shin and Ying paper reports a similar analysis of 46 local carriers over the 1976-1987 period.[10] This paper has the same data limitations, and produces results similar to those of the first paper. Together, the two papers suffer from problems due to the data used, but their results are consistent with those of the other studies.

Two additional recent papers have used simpler econometric models in an attempt to directly relate telephone industry TFP growth to industry output growth. Neither study addresses the impact of network size. John Kwoka[11] analyzed the

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[10] "Costly Gains to Breaking Up: LECs and the Baby Bells," Review of Economics and Statistics, May 1993, pp. 357-361.

[11] "The Effects of Divestiture, Privatization, and Competition on Productivity in U.S. and U.K. Telecommunications," The Review of Industrial Organization, May 1993, pp. 47-62.

former Bell System companies over the 1948-1987 period. His econometric model relates TFP growth to output growth in addition to other structural variables. His model shows that a one percentage point increase in output leads to a .535 percentage point increase in TFP. Robert Crandall and Jonathan Galst[12] estimate an econometric model that similarly links TFP growth to output growth. They estimate this model for the former Bell System companies, independent local exchange carriers, and the entire telephone industry for the years 1961-1987. They find that a one percentage point increase in output increases TFP growth .34 percent for the former Bell System companies, .55 percent for the independent local exchange carriers, and .37 percent for the entire industry.

Finally, we briefly note a number of recent econometric studies based on the data developed by Christensen, Christensen, and Schoech. These studies have been conducted by David Evans and James Heckman;[13] A. Charnes, W.W. Cooper, and T. Sueyoshi;[14] and Lars-Hendrik Roller.[15] The authors have attempted to estimate

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[12] "Productivity Growth in the U.S. Telecommunications Sector: The Impact of the AT&T Divestiture," Brookings, February 1991.

[13] "Multiproduct Cost Function Estimates and Natural Monopoly Tests for the Bell System," in D.S. Evans, ed. Breaking Up Bell, North-Holland, New York, 1983; "A Test for Subadditivity of the Cost Function with an Application to the Bell System," American Economies Review, September 1984, pp. 615-623; "Natural Monopoly and the Bell System: Response to Charnes, Cooper, and Sueyoshi," Management Science, January 1988, pp. 27-38.

[14] "A Goal Programming/Constrained Regression Review of the Bell System Breakup," Management Science, January 1988, pp. 1-26.

[15] "Proper Quadratic Cost Functions with an Application to the Bell System," Review of Economics and Statistics, May 1990, pp. 202-210; "Modelling Cost Structure: the Bell System Revisited," Applied Economics, September 1990,

models with multiple indexes of output, using the pre-divestiture Bell System data. None of the authors attempt to model network size. The results of these models vary widely, and these researchers have conflicting interpretations of the data. This is not surprising, since the indexes of output used are highly collinear, and it is not possible to econometrically determine the impact of each index on cost. As noted elsewhere,[16] the collinearity of the variables produces meaningless (negative) estimates of marginal costs for some observations within the samples used for the analysis. This also implies that the estimated cost elasticities are unreliable; hence these models are not of value in determining the relationship between output growth and TFP growth.

In conclusion, recent econometric literature supports the conclusion first reached by Caves and Christensen, namely, that the telephone industry has significant economies of density, and suggests that the magnitude of the impact may even be greater than that estimated by Caves and Christensen. This evidence also shows that economies of density exist for the LECs. Using the more conservative Caves and Christensen results, a one percentage point decrease in output will lead to a reduction in TFP growth of between .3 and .5 percentage points.

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pp. 1661-1674.

[16]Leonard Waverman, "U.S. Interexchange Competition," in R.W. Crandall and K. Flamm, eds., Changing the Rules: Technological Change, International Competition, and Regulation in Communications, (Washington, DC, Brookings, 1989), p. 91.

In our recently completed study of post-divestiture LEC total factor productivity[17], we found that over the 1984-1993 period, LEC total factor productivity growth was 2.4 percent. This total factor productivity growth was obtained through output growth of 3.4 percent and input growth of 1.0 percent. In very recent years, LEC output growth has been even lower than 3.5 percent. For example, average annual output growth was 2.6 percent for the 1990-1993 period, compared to 3.8 percent for the 1984-1990 period. The LECs were able to sustain productivity growth in those years through a reduction in total input, but it is possible that such reductions are short-lived. Based on the econometric literature cited above, if the future rate of LEC output growth were to be a full percent lower than the average rate of growth since divestiture, 2.4 percent, then TFP growth would be in the 1.9 percent to 2.1 percent range.

[17]Laurits R. Christensen, Philip E. Schoech, and Mark E. Meitzen, "Productivity of the Local Operating Telephone Companies Subject to Price Cap Regulation, 1993 Update", Christensen Associates, January 1995.

V. The Impact of Toll and Switched Access Output Growth on TFP Growth

The econometric studies reviewed in the previous section focus on the overall relationship between output growth and TFP growth, looking at historical trends. They do not address the impact of output growth reductions that occur exclusively in markets where the services have relatively high contributions to joint and common costs (i.e., low marginal costs relative to price).

As discussed in Section II, services that have relatively high contributions to joint and common costs can make substantial contributions to TFP growth. As output grows in these services, total revenue increases more rapidly than total cost. In "real" terms, total output also increases faster than total input. Conversely, a reduction in the rate of growth of output of these services will lead to a reduction in the TFP growth rate.

Two areas with the potential for future reductions in the rate of output growth that also have relatively high contribution margins are intra-LATA toll and switched access. The Local Exchange Carriers are facing increasing competition in both areas, and the LECs are faced with the prospect that future output growth in these areas will be less than historical growth, as competing firms take business away from them.

Equation (5) can be used to analyze the impact on TFP growth due to reductions in output growth for these two services. This requires information on cost elasticities of output (ϵ_i) and revenue shares (m_i) for these services. Recently Calvin

Monson and Jeffrey Rohlfs[18] reviewed the evidence on the incremental cost of intra-LATA toll and switched access. They concluded that the long-run incremental cost of these services was no greater than $8.9 billion for the Local Exchange Carriers.[19] To convert the incremental cost to a cost elasticity, one must estimate total economic cost for the LECs. Total economic cost is roughly equal to total revenue; total revenue in 1991 (the year of the Monson-Rohlfs analysis) was $86.5 billion. This implies that the cost elasticity of output of intra-LATA and switched access services is approximately .10. On the other hand, the revenue share of these services in 1991 was .31.

Referring back to equation (5), one can see that a one percentage point decrease in the rate of growth for intra-LATA toll and switched access will lead to approximately a .21 percentage point decrease in TFP (i.e., $m_i - \epsilon_i = .21$). Historically, the rate of growth in output for these services has averaged 5.0 percent.[20] It is possible that competition will lower this average rate of growth for the LECs in the future. For example, if the annual average rate of growth were to

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[18] "The $20 Billion Impact of Local Competition in Telecommunications," Strategic Policy Research, July 1993.

[19] The Monson-Rohlfs study evaluated three analyses of incremental cost: Bridger Mitchell, Incremental Costs of Telephone Access and Local Use, Santa Monica, The RAND Corporation, 1990; Lewis J. Perl and Jonathan Falk, "The Use of Econometric Analysis in Estimating Marginal Cost," presented at the Bellcore and Bell Canada Industry Forum, San Diego, California, April 1989; and Michael J. Marcus and Thomas C. Spavins, "The Impact of Technical Change on the Structure of the Local Exchange and the Pricing of Exchange Access: An Interim Assessment," unpublished draft.

[20] This is based on the 1984-93 growth rate for these services reported in our TFP study for the LECs. See Christensen, Schoech, and Meitzen, Id.

drop by one percentage point to 4.0 percent, this would reduce the rate of TFP growth from 2.4 percent to 2.2 percent, all else equal. This would lower the TFP growth differential between the LECs and the private business sector from 2.1 percent to 1.9 percent[21]. Similarly, if the output rate of growth for these services were reduced by two percentage points to 3.0 percent, TFP growth would be reduced to 2.0 percent, and the differential would be reduced to 1.7 percent.

VI. Conclusion

TFP indexes based on revenue weighted output indexes have some very attractive features for purposes of setting a productivity offset in a price cap formula. These TFP indexes are based on a customer oriented measure of output and thereby reflect the success of the company in providing services that the customer values. However, as this paper has shown, TFP growth is also affected by changes in output growth. Reductions in output growth will lead to reductions in the rate of TFP growth. If the reductions in output growth are concentrated in services with high contribution margins, the impact on TFP growth will be even greater. In recent years, we have seen a reduction in the rate of output growth for the LECs. Empirical evidence on returns to density and on the contribution margins for those services most subject to competition suggest that, if these output growth reductions continue into the future, they will have a material impact on the rate of LEC TFP growth.

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[21]The TFP growth differential between the LECs and the private business sector is based on the BLS multifactor productivity measure for the private business sector. This measure had average annual growth of 0.3 percent over the 1984-92 period.

Appendix

Use of a Revenue Weighted TFP Index for Purposes of Constructing a Price Cap Index

Our LEC TFP study uses a revenue weighted Tornqvist total output quantity index. While marginal cost weighted indexes are appropriate for some other applications, the revenue weighted index is proper when evaluating a price cap index. The reason that a revenue weighted index is proper is that it is "dual" to the customer's price index of telephone rates. The use of the revenue weighted output index allows one to relate increases in output price to changes in input price and changes in TFP. In the following paragraphs we demonstrate this principle mathematically.

First we define total revenue to be R and total cost to be C. Total revenue is related to the prices and quantities of output by the following equation:

$$R = \Sigma P_i \cdot Y_i \tag{A1}$$

where
P_i = the price of output i
Y_i = the quantity of output i.

Similarly, total cost is related to the prices and quantities of the inputs used:

$$C = \Sigma W_j \cdot X_j \tag{A2}$$

where
W_j = the price of input j
X_j = the quantity of input j.

Equation (A1) can be converted into an equation representing rates of change in revenue, output prices, and output quantities:

$$r = \Sigma\, m_i \cdot p_i + \Sigma\, m_i \cdot y_i \tag{A3}$$

where

r = growth in revenues
p_i = growth in output price i
y_i = growth in output quantity i
m_i = the revenue share of output i.

Equation (A2) can similarly be converted into an equation relating the rate of change in total cost to the rate of change in input prices and quantities:

$$c = \Sigma\, s_j \cdot w_j + \Sigma\, s_j \cdot x_j \tag{A4}$$

where

c = change in total cost
w_j = change in input price j
x_j = change in input quantity j
s_j = the cost share of input j.

In market equilibrium, as competitive forces constrain firms to earn only a normal profit, the rate of change in revenue equals the rate of change in cost. Thus combining equations (A3) and (A4), one obtains:

$$\Sigma\, m_i \cdot p_i = \Sigma\, s_j \cdot w_j - \{\, \Sigma\, m_i \cdot y_i - \Sigma\, s_j \cdot x_j \,\} \tag{A5}$$

$$= \Sigma\, s_j \cdot w_j - tfp$$

where

tfp = the rate of growth in TFP.

This means that the rate of change in output prices equals the rate of change in input prices less the rate of change in total factor productivity.

Appendix 3

Data Appendix: Tables to Accompany Charts

Table 1
Local Exchange Carrier Output Growth

Year	Total Output Growth Rate
1985	2.4%
1986	3.0%
1987	3.7%
1988	5.2%
1989	4.8%
1990	3.7%
1991	2.3%
1992	1.9%
1993	3.6%
Average, 1984-93	3.4%
Average, 1984-89	3.8%
Average, 1990-93	2.9%

Source: Laurits R. Christensen, Philip E. Schoech, and Mark E. Meitzen, Productivity of the Local Operating Telephone Companies Subject to Price Cap Regulation: 1993 Update (Christensen Associates, January 16, 1995), p. 15.

Table 2
Comparison of U.S. Economy Input Price Growth with Telephone Industry Input Price Growth

Year	U.S. Input Prices	Telephone Input Prices
1949	-1.0%	3.2%
1950	6.3%	5.1%
1951	7.9%	8.8%
1952	1.2%	8.8%
1953	3.7%	2.4%
1954	0.6%	1.9%
1955	6.6%	5.4%
1956	0.7%	1.7%
1957	3.7%	-1.1%
1958	0.5%	3.3%
1959	7.0%	5.4%
1960	-0.6%	4.2%
1961	3.6%	3.9%
1962	4.4%	2.2%
1963	3.8%	1.0%
1964	4.5%	6.0%
1965	5.7%	0.5%
1966	4.6%	1.1%
1967	2.0%	1.9%
1968	4.4%	4.2%
1969	3.7%	2.1%
1970	3.3%	3.8%
1971	6.8%	4.2%
1972	7.2%	8.0%
1973	6.3%	0.6%
1974	4.2%	5.9%
1975	9.4%	14.2%
1976	9.1%	10.7%
1977	8.6%	6.1%
1978	7.8%	7.6%
1979	8.2%	7.2%
1980	6.6%	14.6%
1981	9.9%	11.6%
1982	3.7%	12.1%
1983	5.6%	12.8%
1984	7.4%	1.8%
1985	4.0%	0.1%
1986	3.8%	1.3%
1987	3.1%	1.7%
1988	4.4%	-3.2%
1989	4.1%	-3.7%
1990	4.2%	11.9%
1991	2.9%	1.3%
1992	5.1%	4.4%

Sources:

Telephone Input Prices

1948-1979: L.R. Christensen, D.C. Christensen, and P.E. Schoech, "Total Factor Productivity in the Bell System, 1947-1979," Christensen Associates, Sept. 1981.

1979-1982: Bell Communications Research, "Econometric Estimation of the Marginal Operating Cost of Interstate Access," Special Report SR-FAD-000552, May 1987.

1982-1984: L.R. Christensen, "Total Factor Productivity Growth in the U.S. Telecommunications Industry and the U.S. Economy, 1951-1987," Schedule 3 to Direct Testimony, Case No. PU-2320-90-149, North Dakota Public Service Commission, 1990.

1984-1992: L.R. Christensen, P.E. Schoech, and M.E. Meitzen, "Productivity of the Local Operating Telephone Companies Subject to Price Cap Regulation, 1993 Update," Christensen Associates, January 1995.

U.S. Economy Input Prices

1948-1984: L.R. Christensen and D.W. Jorgenson, "U.S. Real Product and Real Factor Input, 1929-1967," Review of Income and Wealth, Series 16, March 1978, Updated September 1986.

1984-1992: U.S. Bureau of Economic Analysis, "Gross Domestic Product Price Index"; and U.S. Bureau of Labor Statistics, "Multifactor Productivity for the Private Business Sector."

Table 3
California and U.S. Non-Farm Employment Growth

Year	California Growth	U.S. Growth
1985	3.6%	3.1%
1986	2.9%	2.0%
1987	3.4%	2.6%
1988	3.8%	3.1%
1989	2.7%	2.5%
1990	2.1%	1.4%
1991	-1.1%	-1.1%
1992	-1.7%	0.2%
1993	-0.9%	1.8%
1994	0.8%	2.6%
Average, 1984-94	1.6%	2.1%
Average, 1984-89	3.3%	2.7%
Average, 1990-94	-0.2%	1.0%

Source:
Pacific Bell

Table 4
Per Capita Income Ratio of California to U.S.

Year	California Per Capita Personal Income ($,000)	U.S. Per Capita Personal Income ($,000)	Ratio
1984	15.1	13.1	1.15
1985	16.0	13.9	1.15
1986	17.1	14.9	1.15
1987	17.9	15.6	1.15
1988	18.8	16.6	1.14
1989	19.7	17.6	1.12
1990	20.7	18.6	1.11
1991	20.7	19.1	1.08
1992	21.3	20.1	1.06
1993	21.5	20.8	1.04
1994	22.0	21.8	1.01
1995	22.7	22.9	0.99
1996	23.6	23.8	0.99
1997	25.0	24.9	1.01

Source:

Pacific Bell: 1984 to 1994
UCLA Forecast: 1995 to 1997

Table 5
Pacific Bell Output Growth

Year	Total Output	Intrastate Toll	Intrastate Access	Interstate Access
1985	7.4%	6.2%	14.2%	7.9%
1986	7.3%	11.0%	11.7%	8.5%
1987	5.9%	9.0%	8.4%	2.2%
1988	5.8%	7.4%	4.0%	8.3%
1989	5.6%	5.3%	8.6%	5.2%
1990	4.9%	3.2%	9.5%	6.5%
1991	2.6%	-0.3%	5.2%	5.1%
1992	1.9%	0.3%	5.5%	4.1%
1993	2.0%	-1.5%	5.6%	5.0%
1994	2.6%	-0.1%	8.4%	4.6%
Average, 1984-94	4.6%	4.0%	8.1%	5.7%
Average, 1984-89	6.4%	7.8%	9.4%	6.4%
Average, 1990-94	2.8%	0.3%	6.8%	5.1%

Source:
Pacific Bell

Table 6
Pacific Bell Expenses per Average Access Line

Year	Pacific Bell	RHC Average
1984	502	468
1985	507	480
1986	497	482
1987	501	497
1988	497	518
1989	477	520
1990	477	509
1991	494	519
1992	468	506
1993	587	553
1994	458	511

Source:

S.G. Warburg & Co., Inc., Telecommunications Services, Statistical Summary of Regional Bell Holding Companies and GTE, p. 51 (April, 1995). Pacific Bell, Page 51. RHC average:expenses, page 40; access lines, page 20 and page 48.

Table 7
Pacific Bell Employees per 10,000 Access Lines

Year	Pacific Bell	RHC Average
1984	67.0	61.2
1985	59.4	56.5
1986	58.7	54.2
1987	54.1	52.0
1988	50.5	50.1
1989	47.7	48.1
1990	43.8	45.3
1991	41.0	42.1
1992	38.8	39.8
1993	37.0	37.6
1994	33.4	34.1

Source:
S.G. Warburg, page 22.

Footnote 11
Telephone Industry and U.S. Economy TFP Growth
1949-1993

Year	Telephone	U.S.	Differential
1949	-1.1%	0.3%	-1.4%
1950	4.5%	4.4%	0.1%
1951	4.8%	2.4%	2.4%
1952	2.3%	0.1%	2.2%
1953	0.9%	2.0%	-1.1%
1954	0.8%	-0.8%	1.6%
1955	5.2%	4.4%	0.8%
1956	1.4%	-1.4%	2.8%
1957	5.2%	0.3%	4.9%
1958	1.6%	-0.6%	2.2%
1959	5.8%	4.2%	1.6%
1960	3.9%	-1.6%	5.5%
1961	2.2%	2.9%	-0.7%
1962	3.0%	2.3%	0.7%
1963	2.3%	2.7%	-0.4%
1964	3.1%	3.2%	-0.1%
1965	2.9%	3.1%	-0.2%
1966	4.3%	1.8%	2.5%
1967	3.3%	-0.2%	3.5%
1968	4.4%	0.7%	3.7%
1969	3.8%	-0.8%	4.6%
1970	0.6%	-0.9%	1.5%
1971	1.1%	2.2%	-1.1%
1972	4.0%	2.9%	1.1%
1973	4.3%	0.9%	3.4%
1974	3.7%	-3.5%	7.2%
1975	2.8%	0.1%	2.7%
1976	4.4%	2.7%	1.7%
1977	3.6%	2.0%	1.6%
1978	4.8%	0.8%	4.0%
1979	4.2%	-0.1%	4.3%
1980	5.1%	-1.6%	6.7%
1981	0.5%	0.9%	-0.4%
1982	1.0%	-3.0%	4.0%
1983	4.3%	2.0%	2.3%
1984	-2.2%	3.5%	-5.7%
1985	1.1%	0.5%	0.6%
1986	2.8%	1.0%	1.8%
1987	1.8%	0.2%	1.6%
1988	2.1%	0.5%	1.6%
1989	2.0%	-0.2%	2.2%
1990	4.6%	-0.3%	4.9%
1991	1.2%	-1.0%	2.2%
1992	3.5%	1.5%	2.0%
1993	2.6%	0.6%	2.0%